rasaurus and *Atlantosaurus;* H. G. Seeley noticed *Neusticosaurus pusillus (Simosaurus pusillus* Fraas) showing that the structure of its palate is generically different from that of any other plesiosaur; A. W. Waters gave a list of sixty-six chilostomatous Bryozoa from Mount Gambier, South Australia, including twenty-eight species now living, and fifteen not before described; G. W. Shrubsole described a new *Phylloporus* from the Permian limestones; and Professor J. D. Dana made a communication upon the geologic age of the Taconic rocks, maintaining their Silurian age.

MINERALOGY.[1]

THE MANUFACTURE OF ARTIFICIAL DIAMONDS.—Since the now famous experiment of Mr. Hannay in the manufacture of artificial diamonds, the subject has attracted great attention, and has led to a number of experiments in the same direction.

Dr. R. S. Marsden has recently succeeded in producing minute diamonds by a simple process depending upon the solubility of carbon in fused metals, and its subsequent crystallization upon cooling.

In a graphite crucible, lined within with a paste of gum and charcoal, layers of powdered charcoal (prepared by calcining sugar) are laid alternately with small lumps of pure silver, care being taken to keep the silver always surrounded by the charcoal. The closed crucible is then heated for ten hours at the temperature of melted steel, and then buried in hot sand so as to cool very gradually.

On opening the crucible the silver is found in a single lump near the bottom, and shows a crystalline structure. The lump is now dissolved in nitric acid, when the dissolved carbon remains as a grayish-black powder of a bright graphitic luster.

When examined under the microscope, this powder is seen to consist of three different substances: (1) graphite, forming the larger proportion; (2) an amorphous brown substance in flocks, being either amorphous carbon or a carbide of silver; (3) a number of small black octahedral crystals with curved edges. These last are unattacked by hydrofluoric acid or by any acids or alkalies, are hard enough to scratch quartz, and burn in a stream of oxygen gas. These, therefore, appear to be true diamonds, and it is probably merely a matter of experiment whether they can be produced of sufficient size to be of value.

PYRITES AS A SOURCE OF SULPHURIC ACID.—The use of pyrites as a source of sulphuric acid has long been known, but it is only within a few months that American pyrites has been used for that purpose. The distance of deposits of pyrites in this country from manufacturing centers has been the chief drawback. Two

[1] Edited by Professor H. CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.

mines of pyrites have lately been devoted to the manufacture of sulphuric acid. These are the Capelton mines of Canada and the Milan mines of New Hampshire. After the ore has been burned to drive off the sulphur, the cinders are returned to be treated for copper, the pyrites being cupreous. It is said that a pyrites ore, in order to be useful for the manufacture of sulphuric acid, must have a high percentage of sulphur, be near a market, be of medium coarseness, and not be too soft; it must not fuse easily, must contain no arsenic or antimony, must not decrepitate when heated, and must burn readily and down to a low percentage of sulphur: otherwise it will not pay.

A DIMORPHOUS FORM OF TIN.—Small crystals of tin are sometimes found in the slag from the smelting furnaces of tin works. As shown by Trechmann, in slag from Penzance, and by Foullon in slag from Mariaschein, the tin crystals may be of two kinds, either the ordinary tetragonal form, such as are deposited by galvanic action, or, more generally, an *orthorhombic* form, not previously observed.

The general appearance of the latter is that of a loose, irregular mass of thin plates of different sizes, sometimes a quarter of an inch square, which have a bright metallic luster and a grayish color. These plates are built up of a number of sub-crystals, which, having well defined edges, were capable of goniometrical measurement. They were found to have the axial ratio: $a : b : c = 0.387 : 1 : 1.035$.

BLASTING WITH LIME.—A new and ingenious method of blasting has lately been tried at a coal mine in Derbyshire, which, dispensing with the use of gunpowder, depends upon the action of water upon caustic lime. Cylindrical blocks of caustic lime, 2½ inches in diameter by 4½ in length, are prepared by the compression of burnt lime under a hydraulic press. The blocks, each of which has a longitudinal groove ½ inch in diameter, are taken in air-tight boxes to the mine and placed in holes some three feet deep, which have been bored in the coal. By means of an iron pipe which fits into the grooves in the blocks, water is now introduced to the bottom of each hole.

In the course of a few moments a sound like that of steam escaping under high pressure, is heard, which is immediately followed by the breaking down of the coal. There is no sudden explosion or danger from fire.

This method is of course inapplicable for the blasting of hard and compact rocks.

THE FORMATION OF SULPHUR IN THE SOIL OF PARIS.—In the course of an excavation for a sewer in the streets of Paris, the workmen encountered a mass of rubbish consisting of animal and vegetable refuse mixed with bones and with plaster. The bones were filled with crystalline acicular gypsum, and the plaster was

impregnated with crystals of native sulphur. As shown by Daubrée, there is no doubt but that a chemical action has taken place between the organic matter and the plaster to produce these crystals of sulphur. A similar reaction may explain the formation of sulphur in stratified rocks.

MINERALOGICAL NOTES.—The amethysts of the Saxon Obergebirge are found frequently to have become soft and friable. They are often reduced to a fine powder, in which state they are known as *mealy quartz.*——An asbestos from Silesia, made up of short bundles of white interwoven fibers, has been found to contain more than three per cent. of soda.——*Gilbertite*, a mineral from the Saxo-Bohemian tin veins is, according to Frenzel, not a distinct species, but a transition product of the alteration of topaz into potash-mica. The topaz becoming white or greenish-gray, is then called gilbertite, while the latter afterwards becoming laminated and paler in color, finally becomes a potash-mica. Such changes of mineral species are of great interest. ——E. F. Smith and N. W. Thomas announce new localities for *corundum* and *wavellite* in Lehigh county, Penna. The former occurs in well defined and often large hexagonal crystals near Shimersville. One crystal was eight inches long and four and a-half inches wide. The locality has been leased for technical purposes. Wavellite was found in white, radiating nodules upon limonite, near Macunzie, in the same county. It has the composition Al_2O_3 36.66, P_2O_5 34.14, H_2O 28.32, Fl. *trace*, limonite 0.60 = 99.72.—— At a recent meeting of the Microscopical Society of Belgium, M. Prinz read a paper upon the microscopic inclusions in sapphire, ruby and spinel. The paper is accompanied by a plate giving drawings of the remarkable liquid and solid enclosures, the crystals and the microlites which occur in these gems. The minute, hair-like crystals which produce the beautiful asterism of some rubies, are probably rutile.——*Cerite* has recently been shown to contain a new element, to which the provisional name of Beta-Didymium has been given. Ordinary didymium is supposed to be a mixture of at least three different elements, one being true didymium, another being a more basic element of lower atomic weight (Di-β) and the third a less basic element with higher atomic weight.

GEOGRAPHY AND TRAVELS.[1]

AFRICAN EXPLORATION.—Dr. Stecker has left Abyssinia for Kaffa in company with an embassy which has recently visited Abyssinia to offer the allegiance of the Sultan of Kaffa to King Johannes. He, therefore, has good reason to hope for a favorable reception in that country.

Some of the results of the six years' exploration of Shoa and

[1] Edited by ELLIS H. YARNALL, Philadelphia.